Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Review of the Commission's Rules Regarding	)	
the Pricing of Unbundled Network Elements	)	WC Docket No. 03-173
and the Resale of Service by Incumbent Local	)	
Exchange Carriers	)	
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	)	
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COMMENTS OF

THE ASSOCIATION FOR LOCAL TELECOMMUNICATIONS SERVICES

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December 16, 2003

INTRODUCTION

The Association for Local Telecommunications Services ("ALTS") hereby files its initial comments in the above-referenced proceeding in response to the Commission's Notice of Proposed Rulemaking in CC Docket No. 03-173.[1] ALTS contends that the Commission need not abandon TELRIC principles in setting unbundled network element ("UNE") prices in order to achieve its stated goals. Such principles include promoting effective competition and providing for the recovery of incumbent local exchange carrier ("ILEC") system costs. Improvements to the methodology can be made, however, that will satisfy the D.C. Circuit Court of Appeal's objections and remain consistent with economic theory.

ALTS is the leading national trade association representing the interests of facilities-based competitive local exchange carriers ("CLECs"). ALTS member companies' primary objective is to provide facilities-based competition in the telecommunications market, including voice and broadband and other advanced telecommunications services. ALTS members are the companies deploying the alternative facilities needed to offer differentiated services to consumers desperate for competitive choice. As acknowledged in order after order and statement after statement issued by the Commission, CLECs cannot currently provide, and are not required by law or policy to provide, all of their own facilities, particularly the essential, last-mile bottleneck loop facilities, needed to reach potential customers. The rules set forth in the recently-

[1] *In the Matter of Review of the Commission's Rules Regarding the Pricing of Unbundled Network Elements and the Resale of Service by Incumbent Local Exchange Carriers*, CC Docket No. 03-173, Notice of Proposed Rulemaking, FCC 03-224 (rel. September 15, 2003) ("*NPRM*").

adopted *Triennial Review Order*[2] are, arguably, the most important tools to ensure that facilities-based CLECs have fair access to the essential, bottleneck facilities needed to reach customers. Any divergence from those rules, particularly with regard to the rules setting forth access to the local loop – the essential, bottleneck facility and the element most difficult to replicate -- must be taken with utmost care so as not to destabilize the nascent competitive telecommunications industry. The rules adopted in the *Triennial Review Order*, however, are useless unless the prices associated with CLEC access to unbundled network elements are set appropriately. The prices for the UNEs must allow CLECs to compete on a level playing field with their ILEC rivals, who also happen to be their reluctant wholesale providers.

The *NPRM* discusses numerous issues on which the FCC seeks comment, and these Comments and the appended Economist's Report[3] are organized around various anchor questions that encompass the major aspects of the *NPRM*.[4] These Comments provide a summary of ALTS' responses to these issues, and the appended Economist's Report more fully elaborates on the details of ALTS' position, discussing both the broad theoretical approaches to these issues as well as specific modeling assumptions.

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[2] *In the Matter of Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers*, CC Docket No. 01-338, Report and Order and Order on Remand and Further Notice of Proposed Rulemaking, FCC 03-36 (rel. Aug. 21, 2003) ("*Triennial Review Order*").

[3] Analysis of Selected Issues Set Forth in the Notice of Proposed Rulemaking Regarding the FCC's Existing UNE Pricing Methodology, Prepared by Ben Johnson Associates, Inc., December 2003 ("Economist's Report").

[4] In these Comments, the anchor questions are not explicitly given. Rather, our responses to them are listed by topic. The exact questions are quoted in the appended report. Due to the complexity of the issues, a number of the FCC's requests for information deal with the same topic. As a result, one response may be applicable to more than one request.

1. Goals[5]

The Commission states that its goal in establishing a UNE pricing regime is two-fold: (1) to provide appropriate signals to encourage efficient market entry and investment and (2) to allow ILECs to recover their forward-looking costs of providing UNEs. These goals should be maintained because they focus on establishing pricing signals that will encourage effective competition, while at the same time, allowing ILECs to recover legitimate system costs. Most importantly, the current TELRIC methodology satisfies these goals.

Although competitors may eventually be able to develop alternatives to the ILEC networks through deployment of their own facilities, UNE access will continue to play a pivotal role in reducing barriers to entry and encouraging a more rapid transition to effective competition. This is especially true in situations where it is not economically feasible for competitors to install their own facilities. During the transition period to effective competition, the extent of competition may be largely determined by the extent to which competitors are given access to elements of the ILEC's network at reasonable, regulated prices.

Currently, the trend towards effective competition throughout the nation remains in a stage of infancy. While CLECs have steadily increased their market share of access lines, the very large share retained by the ILECs allows these carriers to maintain an overwhelmingly dominant market position. Because of this, in most states the RBOCs have been consistently earning profits far in excess of the levels that would occur under conditions of effective competition. The persistence of these high profit levels is clear, independent proof that the

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[5] *See* Economist's Report at 7-18.

transition to effective competition has not yet been accomplished. There is no valid policy justification for the Commission to adopt new rules that might allow them to earn even higher profit at the expense of their CLEC competitors and consumers. Capital expenditure data from the past seven years shows that CLECs, as well as ILECs, have invested heavily in facilities since the passage of the Act.[6] This indicates that current rules provide ample incentive for investment and recoupment of costs, thus there is no need for significant change to the TELRIC UNE pricing principles to satisfy the Commission's primary goals.

Another telling indication of the difficulties facing new entrants, and a confirmation that we are still in an early stage of the transition to effective competition, is the nearly complete absence of cross-market competitive entry by ILECs outside of their traditional geographic markets. This absence of substantial ILEC entry and market penetration into other ILEC regions strongly suggests the continued presence of very substantial (albeit not always visible) barriers to entry which favor the incumbent carrier in each geographic area, and which make it very difficult for other firms to profitably compete with these firms. Changes to the TELRIC rules which have the effect of increasing UNE rates will tend to exacerbate these barriers to entry, making entry and expansion even more difficult for competitors.

While some CLECs may respond to higher UNE rates by increasing reliance on their own facilities, in most cases the impact of higher UNE rates will be to squeeze CLEC profit margins and make it harder for CLECs to enter or expand their presence in the market. Since UNEs are only subject to TELRIC pricing rules where impairment has been found, an increase in TELRIC

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[6] ALTS Annual Report: The State of Local Competition 2003 at 10.

rates would do nothing but force CLECs to pay those higher rates since access to those UNEs has been found necessary to CLEC survival and expansion. Therefore, in most cases higher UNE rates would not result in greater deployment of CLEC facilities, but would result merely in higher costs for CLECs and higher profits for ILECs. In areas where CLECs have been found unimpaired without access to certain UNEs, the availability of those elements at potentially higher non-TELRIC rates would provide further incentive for CLECs to deploy their own facilities. The Commission need not adopt rules that might increase the TELRIC rates themselves to provide this incentive.

To the extent the existing TELRIC methodology is revised or replaced with new rules that have the effect of substantially increasing UNE rates, the primary effect will not be to accelerate the transition from UNE-based competition to facilities-based competition. Rather, the primary impact will be to discourage competitive entry and to slow the growth of competitive carriers, thereby slowing the transition to effective competition.

2. **Real-world attributes**[7]

Most "real world attributes" can (and should) be accommodated within the economists' classic version of a long run planning horizon. However, the Commission must recognize the important distinction between "real world attributes" related to the underlying cost conditions facing a carrier, and those which are merely descriptive of the actual network that a particular carrier happens to be operating. To the extent the NPRM seeks comments concerning the possibility of modifying the Commission's rules to mandate greater consideration of the

attributes of an ILEC's existing network, regardless of circumstances, such a modification would potentially involve an abandonment of standard long run costing principles. As explained more fully in the appended Economist's Report, more realistic and precise real world attributes can readily be introduced into the UNE cost calculations without reflecting inefficiencies and obsolete aspects of the existing ILEC networks.

Instead of abandoning standard economic costing theory, or the TELRIC methodology in its entirety, it would be more logical for the Commission to fine tune its approach, by requiring state commissions to give greater consideration to real world attributes of the areas served by the ILEC networks. This can be accomplished without heavy reliance on existing ILEC network characteristics (which would tend to require going to a short run costing approach) and without abandoning a standard "long run" costing approach. For instance, the actual location of streets and other rights of way should be accurately reflected in a well-prepared long run cost study. As explained more fully in the appended Economist's Report, reducing the reliance upon truly "hypothetical" assumptions would substantially increase the accuracy of the TELRIC cost calculations.

3. **Long run**[8]

The existing TELRIC approach is consistent with the standard economic concept of the "long run," which is a planning horizon in which all costs are potentially variable. The significance of a long run approach, not constrained by inefficient aspects of a firm's actual

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[7] *See* Economist's Report at 18-22.
[8] *See* Economist's Report at 22-28.

network or embedded costs, is that it allows the Commission to set prices with desirable and predictable impacts that are directly related to the goals of the 1996 Telecom Act. More specifically, a long run approach helps avoid setting element prices so low that little or no incentive exists for the installation of new facilities by new entrants, while at the same time ensuring that CLECs (and their retail customers) are not burdened with excessive costs and inefficiencies.

Given the concerns expressed by the Commission and the courts concerning excessively hypothetical cost calculations, the Commission has, quite reasonably, asked whether a short run costing approach would be preferable to the current long run costing requirements. ALTS urges the Commission not to make such a change. If, however, the Commission concludes it is desirable to change its UNE pricing methodology altogether, it should make explicit its decision to abandon standard "long run" costing principles, and it should explicitly and consistently move toward (or all the way to) a "short run" costing approach.

The Commission must recognize the crucially important distinction between eliminating unnecessarily hypothetical descriptions or assumptions concerning the actual world, and extinguishing any and all hypothetical aspects of the cost calculations. By definition, the long run planning horizon reflects, to a substantial degree, a hypothetical situation – one in which costs are highly variable, and a wide range of network configurations and technology choices are available to the firm. This range of options is broader than the array facing an actual firm making decisions in a short-run planning horizon.

For convenience, it is common practice to describe the long run in terms of time (as the Commission has done in its NPRM). However, in the strictest theoretical sense, the long run does not correspond directly to any particular amount of time. Rather, the long run corresponds to the degree of flexibility the firm enjoys in sizing its capital investment and production process to best fit its output. The long run planning horizon allows the carrier enhanced freedom to select the most cost-effective choice, and thus the carrier is assumed to have complete flexibility to minimize its total costs (and thus its average costs). It is important to realize, however, that "real world" attributes of existing ILEC networks cannot necessarily be directly imported into an appropriate long run cost study, because in actual practice, firms make investment decisions based upon both long run and the short run cost considerations.

4. **Other ways of defining the network**[9]

ALTS believes the existing TELRIC rules can appropriately be modified (or clarified) to require greater accuracy in the cost modeling process. Real world attributes can be more accurately reflected in the cost calculations by reducing the use of simplifying assumptions, by gathering more detailed information concerning the "real world" characteristics of the geographic area served by the ILEC, and by using more detailed modeling algorithms.

The authors of the appended Economist's Report have been active in several state proceedings that have explored the potential for increasing the accuracy of long run cost calculations by introducing, or better using, accurate information about "real world" attributes. In these proceedings, a computer program simulated the type of least-cost routing decisions that

are made by network engineers when designing a new distribution system. In most cases, an attempt is made to minimize the potential for modeling error through the careful selection of inputs and assumptions. However, these simplifying assumptions aren't necessarily accurate under all circumstances. For example, the least cost path tends to be the one that covers the shortest distance along available rights of way; however, in some cases, exceptions occurred where cost savings could be achieved by using a more circuitous routing along other feeder routes. Other modeling errors can occur by using air distances when rights of way and other physical constraints exist and disregarding actual customer locations by assuming customers are evenly spaced along roads and rights of way. The work in these proceedings shows it is feasible (and preferable) to reduce the reliance upon "hypothetical" assumptions and to increase the accuracy of cost calculations.

5. **Higher UNE Prices**[10]

The Commission should be cautious about adopting rule changes which have the effect of increasing UNE rates. If rates increase substantially, the primary impact will not be to encourage CLECs to invest in more of their own facilities. To the contrary, since UNEs are only available where impairment exists, the primary impact of higher UNE rates will be to increase barriers to entry and to slow the trend toward effective competition. As a result, ILECs' retail operations will be further shielded from downward pricing pressures, and the benefits of effective competition will be further postponed or permanently reduced (e.g. by making profitable entry

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[9] *See* Economist's Report at 28-30.
[10] *See* Economist's Report at 31-32.

impossible in certain geographic areas).

6. **Technology**[11]

The FCC has tentatively concluded that it would be unlikely that a competitor would deploy new technology "instantaneously and ubiquitously" throughout the network. It is certainly true that in normal practice firms do not deploy new technology instantaneously and ubiquitously throughout their operations. Nevertheless, that assumption (whether implicit or explicit) is a fundamental feature of the long run planning horizon. It follows directly from the fact that within a long run planning horizon a firm can install the exact quantity and quality of equipment that optimally fits the number of customers it serves and the types of services it sells. Therefore this assumption should not cause the Commission to abandon the economic principles of long run cost in establishing UNE prices.

7. **Fill factors**[12]

Fill factors (essentially the same concept is sometimes described in terms of utilization rates) are estimates of the fraction of total plant that is actually being used. The amount of spare capacity reflected in the fill factors used in a long run cost study will directly impact the resulting unit costs (e.g., cost per circuit or cost per minute of use). Excessively low fill factors raise the per unit costs and vice versa.

The key distinction between long run and short run costs is the extent to which the carrier is able to vary its plant mix and capacity to match demand for its output. In a long run planning

[11] *See* Economist's Report at 33-34.
[12] *See* Economist's Report at 40-43.

horizon, the carrier can optimize its capacity to closely match its output. Accordingly, in a long run cost study, the amount of capacity should closely the volume of circuits and traffic reflected in the study. There should be enough spare capacity to provide operational flexibility (e.g., the ability to quickly respond to fluctuations in the day-to-day level of demand), but not much more. Stated differently, in a long run cost study all costs, and thus all plant configuration details, are variable. Therefore, it isn't appropriate to incorporate unnecessary or inefficient levels of spare capacity in a long run cost study. In contrast, a somewhat larger amount of spare capacity would normally be present on an actual network, where conditions are more like the economists' definition of the short or medium run.

To be consistent with the classic definition of long run cost, a forward-looking study should use fill factors that are higher than the average fill level typically present in an ILEC's network, but less than the highest fill levels that are sometimes present in such a network. Aside from the problems associated with lumpiness, the fill factors should approach the "target" levels used by network engineers to determine when more facilities must be installed, or network rearrangements are required.

8. **Switching**[13]

In a long run cost study, the initial cost of acquiring a new switch is highly relevant and should be given great weight. Among other reasons, new switch transactions represent a substantial fraction of the total volume of sales by switch manufacturers. Purchasers of new switch equipment are often given additional discounts as rewards for high volume purchases or

as an enticement for committing to a particular technology. If the discounts offered to purchasers of new switch equipment were ignored, the effect would be to seriously overestimate the actual cost of switching equipment. By the same token, however, it is not appropriate to completely ignore the cost of routine modifications and additions, which occur throughout the life cycle of the switch. Accordingly, we agree with the suggestion that prices for switching equipment should consider the prices that an efficient ILEC or other entrant would pay for switching equipment over the life cycle of the switch.

9. **Cost of capital**[14]

Cost of capital consists of two components–cost of equity and cost of debt. Weighting or blending these components yields a debt/equity ratio. If the Commission continues to require a long run costing approach when setting rates for UNEs (as we recommend), capital costs should be based upon a cost-minimizing and efficient capital structure. In practice, this means on in which the carrier relies upon low cost debt to the largest extent feasible (given concerns about reasonable overall risk levels), and relatively little reliance upon high cost common equity.

10. **Depreciation**[15]

It is clear that the Commission has attempted to take into account both technological change and economic obsolescence in establishing the generic ranges, as well as the depreciation rates set for individual companies. Furthermore, it is readily apparent that most, if not all, of the prescribed lives are considerably shorter than the expected physical life of the property in

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[13] *See* Economist's Report at 43-45.
[14] *See* Economist's Report at 45-47.

question. In other words, the Commission recognizes that property may be retired for economic reasons prior to the time that wear and tear or physical deterioration would preclude its continued use.

While parties may disagree with the precise lives which have been approved by the FCC (as we do, in some cases) there is no indication that the approach used by the Commission in establishing regulatory depreciation rates is inconsistent with the approach that is appropriate in calculating long run costs. Accordingly, it is reasonable and appropriate to use regulatory depreciation rates when setting UNE rates.

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[15] *See* Economist's Report at 48-49.

CONCLUSION

The FCC need not abandon TELRIC principles in setting UNE prices. Such principles include promoting effective competition and providing for the recovery of ILEC system costs. However, improvements to the methodology can indeed be made that will satisfy the D.C. Circuit Court of Appeal's objections and remain consistent with economic theory.

Respectfully Submitted,

/s/

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December 16, 2003

Analysis of Selected Issues Set Forth in the Notice of Proposed Rulemaking Regarding the FCC's Existing UNE Pricing Methodology

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Analysis of Selected Issues Set Forth in the Notice of Proposed Rulemaking Regarding the FCC's Existing UNE Pricing Methodology

Introduction

On October 17, 2003, the Federal Communications Commission (FCC or Commission) issued its Notice of Proposed Rulemaking (NPRM) regarding the pricing of unbundled network elements and resale of service by incumbent local exchange carriers (ILECs). The following report was prepared at the request of the Association for Local Telecommunications Services (ALTS), for submission with its response to the Commission's NPRM.

In the first section, our report addresses six theory and policy-related topic areas in the NPRM. In the second section, the report addresses eight topic areas related to cost modeling. Each topic area is identified with a brief quote or paraphrase from the NPRM, which are identified by placing the corresponding paragraph number from the NPRM in parenthesis. Some of our analyses are applicable to more than one topic area. The analyses vary in length, due to the widely varying nature of the issues raised in the NPRM. The NPRM solicits comments on narrow and specific issues as well as broad philosophical issues.

Executive Summary

In its NPRM, the Commission asks for comment on its rules governing the pricing of unbundled network elements and resale of service by ILECs. There are a number of overlapping issues for which the Commission requested comment; we have structured this report around some of the main issues put forward in the NPRM. The report starts with a brief introduction, followed by a discussion of some broader, theoretical and policy-related issues, followed by a section that contains responses to some specific cost modeling related questions.

Goals

Two of the FCC's current stated goals are the recovery of forward-looking costs and the development of price signals that facilitate efficient entry by competitors. We agree with both goals, and both are important. Some of the questions asked in the NPRM could be interpreted as suggesting that progress towards effective competition has sufficiently advanced such that the latter, which is an underlying goal of the 1996 Telecom Act, can now be given less emphasis, or disregarded. We strongly disagree with any such suggestions. To the contrary, progress toward effective competition has been slow, and the ILECs continue to benefit from a substantial degree of market power, enabling them to earn monopoly profits which are protected from competitive erosion by the presence of substantial barriers to entry and exit.

Real World Attributes

Some of the hypothetical aspects of TELRIC can be eliminated by simply requiring more accurate, less simplistic cost modeling–to better reflect actual conditions. Other hypothetical aspects of TELRIC are fundamental to the economist's concept of long run costs; these attributes cannot be modified or eliminated without either moving toward a short run cost analysis, or departing from standard economic theory entirely and embarking on an untested, ad hoc costing approach.

For instance, cost models can readily be improved to correctly route cable along existing and potential rights of way, taking into account the presence of rivers, lakes, military installations and other physical attributes of the service area. On the other hand, costs cannot reflect fixed attributes of a particular carrier's network configuration, including the scale and configuration of the cable plant, without abandoning the most fundamental difference between long run and short run cost studies.

Long Run

We do not recommend shifting away from a long run cost analysis. However, if the Commission is troubled by aspects the hypothetical nature of the long run planning horizon, the appropriate response is to first fine tune the Commission's approach, by requiring state commissions to give greater consideration to real world attributes of the areas served by the ILEC networks. As we describe below, our work in Kansas and Idaho state proceedings demonstrates that a high degree of "real world" accuracy can be included in a forward looking cost study without placing excessive reliance on ILEC network data.

Alternatively, if the Commission concludes that TELRIC should be abandoned or drastically changed, the Commission should move toward a short run methodology, rather than abandoning standard economic cost concepts entirely. Historically, the FCC and most state commissions have generally relied upon standard economic cost concepts (when not using embedded costs). We believe this is sound practice both because the theory is well refined and well understood, and because it has certain predictable characteristics which allow parties to better anticipate the consequences of the regulatory decision making process.

If the Commission nevertheless chooses to develop its own approach to costing, e.g. by blending aspects of embedded and economic costs, or by creating a unique mixture of short and long run cost characteristics, the effect will be to create great uncertainty–with respect to multiple details of the new approach and with respect to how this newly invented approach will be interpreted and

implemented by the state commissions and the federal courts. Accordingly we would urge the Commission to avoid drastic changes to the TELRIC rules, particularly of an ad hoc nature. To the extent the Commission finds the existing rules to be excessively hypothetical, it should move along the standard continuum of planning horizons toward the medium run or short run. It should not modify standard long run cost concepts by requiring consideration of specific details of an existing carrier's network, particularly where those details involve technological choices and equipment sizing and network configurations which are not currently consistent with cost minimization in a situation where all costs are variable.

Other Ways of Defining the Network

The Commission can add real world attributes to the TELRIC cost modeling process without abandoning standard economic theory. To the contrary, there is much room for added realism in the cost modeling process, as our past work has demonstrated. Models can be improved to better reflect actual, precise customer locations, actual existing and potential rights of way, and many other geographic factors.

Higher UNE Prices

The Commission should be cautious about adopting rule changes which are likely to increase UNE rates. If changes to the existing TELRIC rules translate into consistently higher UNE rates, the primary impact will <u>not</u> be to encourage CLECs to invest in more of their own facilities. To the contrary, the primary impact of higher UNE rates will be to increase barriers to entry and to slow the trend toward effective competition. This follows directly from the fact that UNEs are only available where impairment exists, and thus most CLECs cannot avoid using UNEs if the rates are increased.

Accordingly, the predictable result of increasing UNE rates will not be to stimulate more investment by CLECs. To the contrary, the predictable result will be to further shield the ILECs' retail operations from downward pricing pressures, and to further postpone or

permanently reduce the benefits of effective competition (e.g. by making it impossible for competitors to profitably serve certain markets).

Technology

The Commission has tentatively concluded that it would be unlikely that a competitor would deploy new technology "instantaneously and ubiquitously" throughout the network. We agree. Nevertheless, this typical, albeit unrealistic, assumption cannot be completely abandoned and replaced with an approach built on specific details of the ILECs' existing network without departing completely from the standard concept of the long run.

The "long run" implies an absence of fixed costs; in turn, this implies a high degree of flexibility in deciding on the specific plant size and configuration. Perhaps this flexibility doesn't need to be achieved "instantaneously and ubiquitously" but the flexibility must exist in some manner, or else one of the most fundamental theoretical attributes of the long run would be effectively abandoned. Stated another way, firms operating in the long run have the freedom to choose whatever technology is most consistent with cost minimization, where costs are being minimized over the entire life cycle of the equipment in question. If the FCC decides to require that costs be calculated based upon specific existing attributes of the ILEC's network, it will be departing from the classic definition of the long run. Any such movement away from the long run should be accomplished by moving toward the short run, rather than by making ad hoc modifications to standard economic costing principles.

Fill Factors

To be consistent with the classic definition of long run cost, a forward-looking study should use fill factors that are higher than the average fill level typically present in an ILEC's network, but less than the highest fill levels which are sometimes present in such a network. The Commission can require development of reasonable fill factors, by requiring use of a life cycle analysis.

Switching

If the Commission continues to use a long run cost approach, switching costs should reflect cost minimization over the life cycle of the switch. Certainly, the initial cost of acquiring a new switch is highly relevant and should be given great weight. However, in order to reflect the actual cost of switching over the entire life cycle of the switch, consideration should also be given to the higher prices (lower discounts) that are often applied to subsequent purchases.

Cost of Capital

Capital costs should be based upon a cost-minimizing and efficient capital structure. In practice, this means one that relies on low cost debt to the largest extent feasible.

It is not appropriate to develop capital cost calculations using stock market valuation data to weight the mixture of debt and equity. This approach is particularly inappropriate in the current situation, where many of the ILECs are earning supracompetitive profits, because this skews the market capitalization data upward, placing excessive weight on high cost equity and insufficient weight on low cost debt.

Depreciation

We believe the FCC-prescribed depreciation lives are sufficiently forward-looking, adequately reflecting the effects of rapid technological change and competition. There is no indication that the approach used by the Commission in establishing regulatory depreciation rates is inappropriate for the purpose of calculating long run costs. To the contrary, regulated deprecation rates reflect the impact of all relevant economic factors, including competition and technological change, as well as physical factors.

Responses to FCC Requests for Comment: Theory and Policy

Overall Goals

FCC Request

In the *Local Competition Order*, the Commission found that a UNE pricing regime should achieve two objectives. First, UNE prices should be set in a manner that sends efficient entry and investment signals to all competitors. (79) Second, UNE prices should provide ILECs an opportunity to recover the forward-looking costs of providing UNEs. (80) We ask parties to comment on whether these should remain the primary goals of the Commission's UNE pricing rules. If not, parties should identify alternative pricing goals and explain what circumstances have changed since 1996 that would justify changing the Commission's objectives. (38)

With respect to the first objective, (providing appropriate economic signals with respect to efficient competitive entry), we seek comment on how the Commission could measure empirically whether those prices are sending appropriate signals with respect to competitive entry and investment? What should we expect to see in the market if UNE prices are sending correct economic signals? At what speed and over what period of time would we expect entry and investment to occur? (39)

BJA Analysis

The First Report and Order issued by the FCC shortly after adoption of the 1996 Telecom Act speaks directly to objectives of the Act.

> Three principal goals established by the telephony provisions of the 1996 Act are: (1) opening the local exchange and exchange access markets to competitive entry; (2) promoting increased competition in telecommunications markets that are already open to competition, including the long distance services market; and (3) reforming our system of universal service so that universal service is preserved and

> advanced as the local exchange and exchange access markets move from monopoly to competition. ... The Act directs us and our state colleagues to remove not only statutory and regulatory impediments to competition, but economic and operational impediments as well. We are directed to remove these impediments to competition in all telecommunications markets, while also preserving and advancing universal service in a manner fully consistent with competition. [First Report and Order, August 1, 1996, ¶ 3]

While telecom markets have long been regulated, it has also been long recognized that rate regulation serves as a surrogate for the competitive market. Regulation was relied upon by Congress and other policy makers because effective competition has generally been absent in local telecom markets. Instead, these important markets have been dominated by a handful of carriers enjoying substantial monopoly power.

Under the Telecommunications Act of 1996 (Act), the FCC and state commissions were charged with overseeing a transition to a system that places greater reliance on competition, and less reliance on direct regulation of prices and profits. To the extent effective competition can successfully be introduced, it becomes less necessary to rely upon detailed regulation to protect and advance the public interest.

Effective competition forces all firms in the industry to adapt their products and services to the demands of consumers, drives prices downward toward the actual cost of service, and promotes productive efficiency, to the benefit of society as a whole.

The First Report and Order speaks to the ways in which the 1996 Telecom Act was designed to encourage competition in local markets.

> The Act contemplates three paths of entry into the local market -- the construction of new networks, the use of unbundled elements of the incumbent's network, and resale. ... We anticipate that some new entrants will follow multiple paths of entry as market conditions and access to capital permit. ... Some competitors may use unbundled network elements in combination with their own facilities to serve densely populated sections of an incumbent LEC's service

> territory, while using resold services to reach customers in less densely populated areas. [First Report and Order, August 1, 1996, ¶ 12]

The first of the three paths (UNE access) is described in Section 251(c) of the 1996 Telecom Act.

> (c) Additional Obligations of Incumbent Local Exchange Carriers.--In addition to the duties contained in subsection (b), each incumbent local exchange carrier has the following duties:
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> > (3) Unbundled access.--The duty to provide, to any requesting telecommunications carrier for the provision of a telecommunications service, nondiscriminatory access to network elements on an unbundled basis at any technically feasible point on rates, terms, and conditions that are just, reasonable, and nondiscriminatory in accordance with the terms and conditions of the agreement and the requirements of this section and section 252. An incumbent local exchange carrier shall provide such unbundled network elements in a manner that allows requesting carriers to combine such elements in order to provide such telecommunications service.

Although competitors may eventually be able to develop alternatives to the incumbent local exchange carrier (ILEC) networks through installation and use of their own facilities, access to UNEs will continue to play a pivotal role in reducing barriers to entry and encouraging a more rapid transition to effective facilities-based competition. This is especially true in situations where it is not economically feasible for competitors to install their own facilities. During the transition period, the extent of competition may be largely determined by the extent to which competitors are given access to elements of the incumbent carrier's network at reasonable, regulated prices.

The transition from a regulated monopoly environment to effective competition cannot be completed overnight. In the current environment, new entrants may have to take drastic measures (e.g., incurring very high sales costs, or offering substantially more attractive prices than those of the ILEC) in order to overcome customer inertia or customers' perception that the ILEC is the "safest" and most reliable choice. CLECs face unavoidable difficulties in attempting to enter new markets and increase their market share. In some cases, this has forced carriers to endure very low, or negative, profit margins under the existing TELRIC pricing environment.

To the extent the existing TELRIC system is revised or replaced with new rules that have the effect of substantially increasing UNE rates, the primary effect will not be to accelerate the transition from UNE-based competition to facilities-based competition. Rather, the primary impact will be to discourage competitive entry and to slow the growth of competitive carriers, thereby slowing the transition to effective competition. The risk of unintended consequences is particularly serious in this situation, because of the fact that current market characteristics fall far short of effective competition. Nearly seven years after passage of the 1996 Telecom Act, most local telecom markets continue to be dominated by the Regional Bell Operating Companies (RBOCs) and other ILECs. These markets have been moving slowly down the path toward effective competition, but most local markets remain far short of that goal, as evidenced by the extremely high market shares retained by the incumbent firm, and the extraordinarily high supracompetitive profits being earned by these firms.

A review of actual market data confirms the magnitude and impact of the barriers to entry that exist in these markets. Data published by the FCC, such as market shares, as well as standard economic statistics that can be derived from this data, such as 4-firm concentration ratios and Herfindahl-Hirschmann indexes (HHI) paint a clear picture. Whether viewed at a national, state, or local level, it is clear that while the ILECs no longer enjoy a pure monopoly position, they continue to dominate most telecom markets.

The Commission's local competition reports confirm that competition is not yet effective in most markets. Prior to passage of the 1996 Telecom Act, the CLEC share of most telecom markets was virtually too small to measure. In 1994, for example, CLECs attained 0.2% of carrier revenues nationally. Thereafter, however, CLEC market shares began to accelerate, so that by 2000, CLECs had captured an average of 3.4% of local exchange revenues.

In more recent years, the Commission has compiled and published CLEC market share data based on the number of lines each carrier serves. The following table contains the relevant data since the Commission began publishing this statistic in its Local Telephone Competition Reports, in August 2000.

Table 1
End-User Switched Access Lines Reported

Date	ILEC Lines	CLEC Lines	Total Lines	CLEC Share
December 1997	157,132,000	1,876,000	159,008,000	1.2%
June 1998	159,118,000	2,692,000	161,810,000	1.7%
December 1998	161,191,000	3,423,000	164,614,000	2.1%
June 1999	162,909,000	4,268,000	167,177,000	2.6%
December 1999	181,307,695	8,194,243	189,501,938	4.3%
June 2000	179,761,930	11,557,381	191,319,311	6.0%
December 2000	177,641,529	14,871,409	192,512,938	7.7%
June 2001	174,861,248	17,274,727	192,135,975	9.0%
December 2001	172,043,582	19,653,441	191,697,023	10.3%
June 2002	167,472,318	21,644,928	189,117,246	11.4%
December 2002	162,742,937	24,765,873	187,508,810	13.2%

While CLECs have steadily increased their share of end users, the very large share retained by the ILECs keeps these carriers in an overwhelmingly dominant market position.

The existing TELRIC pricing rules have undoubtedly contributed to the erosion of the ILEC's previous near-100% share of local revenues and lines, but it is not yet time to assume the purpose has been achieved, and that reasonable, regulated UNE rates are no longer necessary. It is surely premature to abandon the TELRIC rules and replace them with a pricing system that makes it more difficult for CLECs to enter the market or expand their footprint or serving area. As of today, most telecom markets cannot possibly be classified as

effectively competitive, considering that ILECs continue to serve far more than 70% of customer lines nationwide.

The same conclusion is reached when the data is analyzed in greater detail, using more complex statistics like 4-firm concentration ratios and HHIs developed on an individual market basis. In general, the higher the 4-firm concentration ratio, the more monopolized, and less competitive, the market. If the top four firms control more than 70% of the market, it is unlikely that competition will be fully effective. Rather, the largest one or two firms will often dominate the industry, while smaller firms follow the leader(s).

Economists use HHIs because it reflects the well-established fact that where industry sales are highly concentrated in a small number of firms, the largest firms tend to have market power, and market results tend to deviate greatly from the purely competitive benchmark. HHIs are used by the United States Department of Justice ("DOJ") and the Federal Trade Commission ("FTC") to assess market concentration levels. Merger Guidelines adopted by DOJ specify that: 1) HHIs below 1,000 indicate that the market is "unconcentrated"; 2) HHIs between 1,000 and 1,800 indicate that the market is "moderately concentrated"; and 3) HHI's above 1,800 indicate the market is "highly concentrated." [1997 Merger Guidelines, §1.51] Where a high HHI is present, or a merger would significantly increase the HHI, DOJ is less likely to approve a proposed merger or acquisition. Not only does the HHI provide a sound basis of judging where a market stands on the continuum from pure competition to pure monopoly, it is particularly useful because it captures in a single number the extent to which sales are concentrated in a small number of firms as well as the distribution of market shares across multiple firms.

For example, in a detailed analysis of hundreds of North Carolina local markets, we found that the ILECs (Verizon, BellSouth, and Sprint) continue dominate the local markets where they previously served as a regulated monopoly, holding a market share far in excess of 70% in nearly every local market. Similarly, in Indiana, we found that SBC continues to control more than 70% of local markets where it previously functioned as a regulated monopolist.

As a result of this continued dominance by the incumbent carrier, we found 4-firm concentration ratios in excess of 70% (typically approaching 95%) in the vast majority of individual local markets. Virtually the only exceptions were in markets with unusual characteristics–e.g. those where enterprise-scale large business customers had abandoned the ILEC.

In these and other states we have consistently found the HHI statistics remain well in excess of the 1,800 benchmark, indicating that local markets remain "highly concentrated." In most markets, the HHI statistics remain in excess of 5,000, although market conditions can vary widely from area to area. In all but a handful of unusual local markets, the trend towards effective competition remains in a stage of infancy, with HHI statistics well above 1,800.

This conclusion is confirmed by another data set: the persistently high level of supracompetitive profits being earned by the RBOCs. In most states the RBOCs have been consistently earning profits far in excess of the levels that would occur under conditions of effective competition. The persistence of these high profit levels is clear, independent proof that the transition to effective competition has not yet been accomplished.

The ability of the ILECs to sustain abnormally high profit levels is particularly striking given the economic context of the past few years–a time when other technology-related sectors of the economy, including internet firms, manufacturers of telecom equipment, long distance carriers, and competitive local exchange carriers have all been suffering from returns below their cost of capital, with some of these firms being pushed into severe financial distress or bankruptcy. Meanwhile, ILECs like SBC have been able to consistently earn profits far in excess of their cost of capital. Because competition remains in a nascent stage, neither competitive pressures nor weak economic conditions have forced the RBOCs to reduce their prices to levels closer to their unit costs.

The following graph compares an estimate of the ILECs' costs of equity with the achieved returns on equity earned by these firms over the 40-year period ending in 2001. The years prior to passage of the

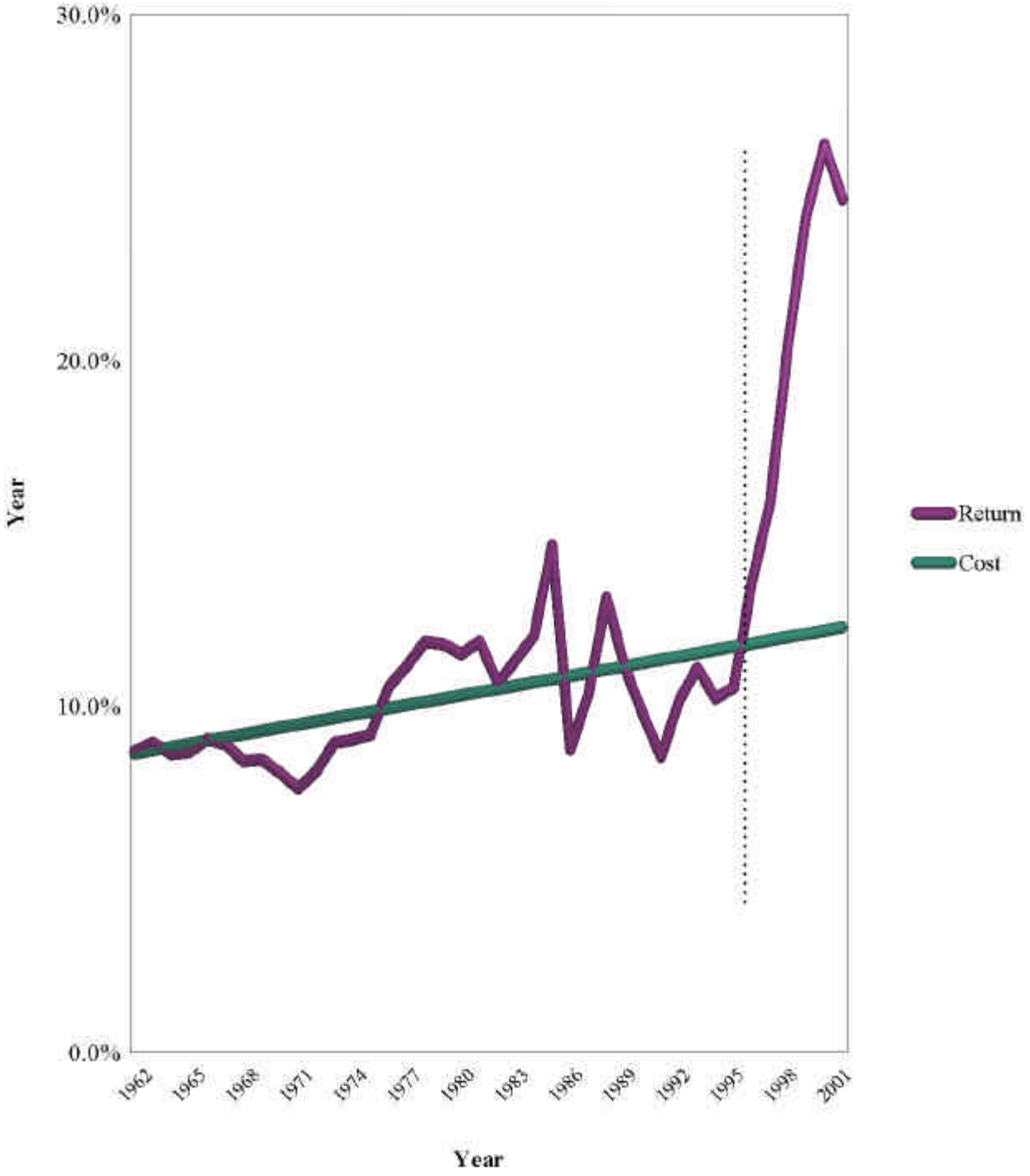
1996 Telecom Act are found to the left of the dotted vertical line on the graph. As shown, the achieved returns (the purple line) generally fluctuated in a narrow range above and below the estimated cost of equity (the green line) throughout this 34 year period. Of course, traditional regulation was not perfect, and the industry sometimes briefly enjoyed economic profits (when costs declined faster than prices, or decreased while prices were increasing), and it sometimes suffered economic losses (when prices declined faster than costs, or decreased while costs were increasing). However, discrepancies were generally short-lived, and they fell both above and below the cost of equity benchmark. This suggests that during the period prior to passage of the 1996 Telecom Act regulation was very effective in keeping prices aligned with costs and preventing monopoly profits, while ensuring that firms had an opportunity to earn a normal return and maintain their financial integrity.

As can be seen in the portion of the graph falling to the right of the dotted vertical line, this pattern changed dramatically beginning in the mid 1990s. As shown on the graph, ILEC equity returns soared high above the cost of equity, resulting in very substantial and persistent supracompetitive profits during the most recent years. The greatest disparity occurred in the last few years, when industry-wide equity returns for the RBOCs averaged around 25%, roughly double the cost of equity during these years. This divergence between equity costs and returns is directly related to the divergence in prices and costs.

Another telling indication of the difficulties facing new entrants, and a confirmation that we are still in an early stage of the transition to effective competition, is the nearly complete absence of cross-market competitive entry by ILECs outside of their traditional geographic markets. Considering that more than seven years have passed since the 1996 Telecom Act was adopted, it is remarkable that none of the RBOCs have made any substantial effort to enter into geographic areas dominated by any other ILEC, despite the fact that these firms all have the necessary capital, skills, expertise and knowledge required to expand beyond their own territory.

Firms like Qwest and BellSouth have made no more than token efforts to enter local exchange markets outside of their traditional

ILEC Equity Costs and Returns: 1962-2001



service territories–either within the regions they dominate (the West and Southeast, respectively) or outside of those regions. The other RBOCs, SBC and Verizon, have made enormous nationwide expansion efforts, demonstrating a clear corporate preference for expanding beyond their traditional territory in order to serve customers throughout the nation and the world. Yet, these firms have limited their expansion efforts almost entirely to mergers and acquisitions, and to diversification into other technologies (e.g. wireless). Neither of these firms has made a comparable effort to expand by entering markets dominated by other RBOCs, either through the access to UNEs (e.g. from each other or from BellSouth, Sprint and Qwest) or through the installation of their own wireline facilities.

Like the hound that didn't bark, this absence of substantial entry and market penetration into other geographic areas by these knowledgeable, well financed local exchange carriers is extremely significant. It strongly suggests the continued presence of very substantial (albeit not always visible) barriers to entry which favor the incumbent carrier in each geographic area, and which make it very difficult for other firms to profitably compete with these firms. Changes to the TELRIC rules which have the effect of increasing UNE rates will tend to exacerbate these barriers to entry, making entry and expansion even more difficult for competitors.

In conclusion, we agree with the FCC's stated objectives, but are concerned that many of the potential changes to the TELRIC rules suggested by the NPRM will not have the intended effect of accelerating progress toward those objectives. To the contrary, many of the potential changes indicated in the NPRM would likely have the effect of substantially increasing UNE rates, making it more difficult for CLECs to enter the local market and compete.

The FCC should not radically revise its TELRIC rules in ways that will further slow, or halt, the transition to effective competition. Drastic changes to the TELRIC rules will tend to further discourage efficient entry by new entrants, due to increased uncertainty. Furthermore, even modest changes to the rules could have the effect of discouraging efficient competitive entry, particularly if the rule

changes have the effect of increasing UNE rates in most cases. While some CLECs may respond to higher UNE rates by increasing reliance on their own facilities, in most cases the impact of higher UNE rates will be to squeeze CLEC profit margins and make it harder for CLECs to enter or expand their presence in the market. This logically follows, since UNEs are only subject to TELRIC pricing rules where they are vital to CLEC survival and expansion. Since CLECs would be impaired in their ability to serve the market if UNEs were not available, it logically follows that rule changes that increase UNE rates will tend to make it more difficult, or impossible, for CLECs to enter and expand their presence in markets where impairment exists.

Real World Attributes

FCC Request

We seek comment on an approach that bases UNE prices on a cost inquiry that is more firmly rooted in the real world attributes of the existing network, rather than the speculative attributes of a purely hypothetical network. (4)

BJA Analysis

The Commission and the courts have understandably been disturbed by some of the more hypothetical aspects of the TELRIC methodology. However, it is important to recognize that a reliance on hypothetical assumptions is inherent to the very concept of a long run planning horizon. The Commission cannot completely avoid or eliminate reference to hypothetical assumptions without abandoning its stated preference for a "long run" costing approach. In other words, in order to eliminate some of the hypothetical aspects of the TELRIC methodology, it will be necessary to move back along the continuum toward (or all the way to) a short run costing approach. Even if the Commission chooses to do this, it would not mean it is necessary to abandon the concept of a forward-looking cost approach, nor is it necessary to abandon standard economic cost theory or concepts.

However, before considering the option of moving away from a "long run" cost approach toward a "short run" cost approach, it is important to realize that other options exist. For instance, the Commission could clarify its existing rules to require long run cost analyses that are deeply rooted in real world characteristics, and which do not rely on highly speculative assumptions about future technologies, and the like.

Most "real world attributes" can (and should) be accommodated within the economists' classic version of a long run planning horizon. For instance, the actual location of streets and other rights of way are accurately reflected in a well prepared long run cost study. There is nothing inherent in long run cost theory that requires (or supports) an assumption that wires can be placed along the shortest possible path, without regard to actual real world rights of way. To the contrary, a failure to consider actual rights of way can at best be described as a matter of administrative convenience (e.g. an intentional simplification of the modeling process) and at worst be described as modeling error.

Under the existing TELRIC rules, simplifications with regard to various real world attributes are allowed. In actual practice, however, most state commissions have required simplifying assumptions be implemented in a way that minimizes bias in the final cost calculations. For instance, where actual rights of way are not known and route distances are estimated, these estimates are typically developed using conservative "right angle" computations, rather than assuming cable can be laid directly from one location to another.

There is an important distinction between "real world attributes" related to the underlying cost conditions facing a carrier, and those which are merely descriptive of the actual network that a particular carrier happens to be operating. To the extent the NPRM seeks comments concerning the possibility of modifying the Commission's rules to mandate greater consideration of the attributes of an ILEC's existing network –regardless of circumstances–such a modification would potentially involve an abandonment of standard long run costing principles. For example, if the Commission were to require consideration of real world attributes of the ILEC network that are

inconsistent with long run cost-minimization, the results would not properly be characterized as a "long run" costs. This is true, regardless of whether the inconsistencies arise because of inefficiencies inherent in the ILEC's network planning process, or because of changes in technology or circumstances which have caused a shift from what was previously a cost-minimizing arrangement to one that would currently qualify as cost-minimizing. For instance, a cost study that is based upon the cost of obsolete analog switches, or which incorporates excessively costly long copper loop lengths, cannot properly be characterized as a long run cost study. This remains true despite the fact that these facilities represent "real world attributes" of the existing ILEC networks.

If, for some reason, the Commission concludes it is desirable to change its UNE pricing rules in this manner, it should make explicit its decision to abandon standard "long run" costing principles, and it should explicitly and consistently move toward (or all the way to) a "short run" costing approach. It is certainly possible to accurately calculate the ILEC's economic costs associated with the "real world attributes" of their existing networks. If they are appropriately developed, these would represent "short run" (or "medium run") costs. They would <u>not</u> properly be described as "long run" costs.

It should also be noted that, under the 1996 Telecom Act, the FCC may have the discretion to completely abandon traditional economic cost concepts like the "long run" and the "short run." However, we do not think it would be advisable for the Commission to venture into uncharted waters of its own invention (e.g. creating rules that are not tethered to traditional embedded cost concepts, and are not tethered to standard economic cost concepts like the "run"). We do not think this would be a prudent approach, nor is it required by any of the recent court decisions. The courts have not asked the FCC to jettison standard economic costing concepts, like the "long run." Rather, they have urged greater care in how these concepts are implemented. For instance, the United States Supreme Court said:

> We cannot say whether the passage of time will show competition prompted by TELRIC to be an illusion, but TELRIC appears to be a reasonable policy for now, and

> that is all that counts. See *Chevron*, 467 U. S., at 866. The incumbents have failed to show that TELRIC is unreasonable on its own terms, largely because they fall into the trap of mischaracterizing the FCC's departures from the assumption of a perfectly competitive market (the wire-center limitation, regulatory and development lags, or the refusal to prescribe high depreciation and capital costs) as inconsistencies rather than pragmatic features of the TELRIC plan. Nor have they shown it was unreasonable for the FCC to pick TELRIC over alternative methods, or presented evidence to rebut the entrants' figures as to the level of competitive investment in local-exchange markets. In short, the incumbents have failed to carry their burden of showing unreasonableness to defeat the deference due the Commission. We therefore reverse the Eighth Circuit's judgment insofar as it invalidated TELRIC as a method for setting rates under the Act. [SUPREME COURT OF THE UNITED STATES, Cite as: 535 U. S. ____ (2002), page 52]

Instead of abandoning standard economic costing theory, or the TELRIC approach in its entirety, it would be more logical for the Commission to fine tune its approach, by requiring state commission to give greater consideration to real world attributes of the areas served by the ILEC networks. This can be accomplished without heavy reliance on existing ILEC network characteristics (which would tend to require going to a short run costing approach) and it can be accomplished without abandoning a standard "long run" costing approach.

As we explain in the next section, more realistic and precise real world attributes can readily be introduced into the UNE cost calculations without reflecting inefficiencies and obsolete aspects of the existing ILEC networks. This can be accomplished by requiring more accurate cost modeling (e.g., by requiring the cost calculations that accurately reflect the location of existing rights of way).

Regardless of whether the TELRIC rules are to be slightly modified, drastically changed, or completely jettisoned, the new rules should be fully consistent with sound economic principles. For instance, it would be far better to replace the existing long run costing approach with a short run costing approach than to adopt an ad-hoc

methodology that mixes elements of long run, short run, and embedded costing approaches.

Long Run

FCC Request

In the *Local Competition Order*, the Commission defined the term "long run" to mean a period long enough for all of a firm's costs to become variable or avoidable.(101) Does our tentative conclusion compel us to shift from a long run average cost methodology to a short run average cost methodology? (55)

BJA Analysis

The existing TELRIC approach is consistent with the standard economic concept of the "long run," which is a planning horizon in which all costs are potentially variable. To see this consistency, consider a few examples of the definition of the long run taken from a variety of different economic texts:

> The long run is the period during which all resources (and thus all costs of production) can be changed either increased or decreased. By definition, there are no fixed costs in the long run. All long run costs are variable. Changes in the price of any resource will affect a firm's production decisions. [McKenzie, Richard and Lee, Dwight. *Microeconomics for MBA's, Putting Economic Theory to Work in Understanding Markets and Managing Firms*, 1999]

> Long run - In microeconomics a period of time long enough to enable producers of a product to change the quantities of all the resources they employ; period in which all resources and costs are variable and no resources or costs are fixed. [McConnell and Brue, *Economics 14th Edition*, McGraw-Hill]

> Long run - period of time long enough that the quantities of all the inputs to production can be varied. The long run decision is a planning decision.[Carlson J.L., and N.T. Skaggs. *Microeconomics: Individual choice and its consequences*, Pearson Allyn & Bacon, 1992]

These examples, and dozens of similar quotes that can be found in a wide array of standard economic textbooks, confirm that the Commission's current understanding of the term "long run" is fully consistent with standard economic theory.

The long run is an inherently theoretical construct, albeit a very useful and realistic one. It provides an appropriate foundation for costing and pricing decisions. When properly implemented, it yields cost estimates that have certain well-understood and important qualities. While the 1996 Telecom Act does not mandate the use of long run economic cost data, it is reasonable to use this type of cost estimate in pricing unbundled network elements, as recommended by the FCC. Furthermore, section 252(d)(1) of the Act specifically requires pricing of UNEs based on their cost of provision, "determined without reference to a rate-of-return or other rate-based proceeding."

The significance of a long run approach, not constrained by inefficient aspects of a firm's actual network or embedded costs, is that it allows the Commission to set prices with desirable and predictable impacts that are directly related to the goals of the 1996 Telecom Act. More specifically, a long run approach helps avoid setting element prices so low that little or no incentive exists for the installation of new facilities by new entrants, while at the same time ensuring that CLECs (and their retail customers) are not burdened with excessive costs and inefficiencies.

The long run is a useful theoretical construct that helps explain firm behavior, and the incentives, opportunities and constraints that affect a firm's behavior in actual practice. However, it should not be confused with the evolutionary process in which real world carriers engage as they expand, contract, and respond to changing market conditions and technologies. In the "real world" carriers deploy networks over a period of years. The ILEC continues to grow and replace its facilities at a pace that minimizes its costs. But this is a description of a dynamic process that is more closely analogous to a sequence of short run planning horizons, rather than a true long run planning horizon. It is also important to realize that "real world"

attributes of existing ILEC networks cannot necessarily be directly imported into an appropriate long run cost study, because in actual practice, firms make investment decisions based upon both long run and the short run cost considerations.

> The long run never exists except in theory...You will never have a situation in which all of your costs are variable...You never really reach the long run....As you proceed through the long run, you are forced to make decisions that will push the long run further into the future.@ - Stephen L. Slavin. *Economics* 2002. McGraw Hill .

> "The long run trend is but a slowly changing component of a chain of short-period situations; it has no independent entity@. Kalecki, M. (1971). *Selected Essays on the Dynamics of the Capitalist Economy*. Cambridge University Press, Cambridge.

> In the long run, all inputs are variable, so output can range from zero to an indefinitely large quantity. The long run is only a planning horizon. Organizations operate in the short run and plan in the long run. The short and the long run are not definite periods of calendar time; they are sets of conditions. Between the short run and long run there can be no sharp or exact distinction. The two merge into each other and are industry and technology dependent. - Richard J. Tersine, Oklahoma University.

When considering long run production decisions, the firm can analyze (and select) virtually any size plant and virtually any mix of inputs (e.g., copper vs. fiber). This wide array of options is not available in the short run, and thus data reflective of a "real world" network tends to reflect a mixture of both long run and short run considerations.

For convenience, it is common practice to describe the long run in terms of time (as the Commission has done in its NPRM). However, in the strictest theoretical sense, the long run does not correspond directly to any particular amount of time. Rather, the long run corresponds to the degree of flexibility the firm enjoys in sizing its capital investment and production process to best fit its output.

With the added flexibility provided by a long run planning horizon, the firm may be able to produce output at a lower total cost than is

possible in a short run planning horizon. When calculating costs in a short run context, the carrier tends to have fewer options and it may be burdened with mistakes, inefficiencies, older technologies, and other factors that add to its average costs, due to various attributes of its past investment decisions. That does not mean, however, that short run costs will necessarily always be higher than long run costs. To the contrary, short run costs may be higher or lower than long run costs, depending upon the factual circumstances applying in each specific situation. For instance, while a carrier operating within a short run planning horizon may be encumbered by some inefficiencies and limitations due to past decisions, some of those decisions are treated as "sunk." This means that the expenditures are no longer relevant, and are therefore excluded from a correctly developed measure of the firm's short run costs.

The existence of sunk costs influences the carrier's optimization criteria, potentially causing the carrier to make decisions which are different from what it would choose in a long run context. For example, in the short run, a carrier that wants to provide xDSL service may respond by engaging in a costly, labor intensive process of retrofitting or modifying its existing network in order to make it capable of providing this new technology. For instance, it may send technicians into the field in order to remove load coils and excessive bridged taps on long loops. This modification makes it feasible to provide xDSL service using copper cable that is already present in the network. In the context of a short run planning horizon, this option is generally cheaper than overbuilding the existing network with additional copper or fiber cable.

However, when our focus shifts to the long run planning horizon, the carrier may find a cheaper alternative. For example, it might eliminate the need for load coils by limiting the length of the copper cables within its system, or configuring its network to minimize loop lengths. In some cases, it might conclude that thicker, more costly copper cables are the most cost effective way to serve certain groups of customers, eliminating the need for load coils and making it feasible to provide xDSL service without the necessity of installing fiber electronics. If a mixture of copper and fiber would be cheaper than

installing heavier gauge copper cable, it can select that option. Like a new entrant that is starting from scratch, an existing carrier is assumed to have a complete array of options in the long run planning horizon.

The long run planning horizon allows the carrier enhanced freedom to select the most cost-effective choice, and thus the carrier is assumed to have complete flexibility to minimize its total costs (and thus its average costs). Such complete flexibility includes some options, like fine-tuning of cable sizes and types, and the freedom to avoid the use of older, less cost effective technologies, which simply are not practical options in a short run planning horizon. Consideration of these examples demonstrates the potential problem with modifying the TELRIC rules to require greater consideration of the "real world" attributes of the ILECs existing networks. Some of those existing network characteristics are properly considered in a short run cost study, but they must be excluded if a cost study is to be correctly developed consistent with standard long run costing principles. For instance, a study that reflects obsolete technology, or inefficiencies due to past investment decisions cannot properly be described as a "long run" cost study, even if those characteristics are brought into the study for the purpose of more accurately reflecting "real world" attributes of the ILEC's existing network. With respect to some of the specific questions asked by the Commission in its NPRM, some of these questions appear to contemplate potential changes to the TELRIC rules that would require shifting away from a "long run" costing approach; other changes could be accommodated by simply requiring a reduction in modeling error (requiring parties submitting TELRIC cost studies to model long run cost levels more accurately).

Given the concerns expressed by the Commission and the courts regarding excessively hypothetical cost calculations, the Commission has, quite reasonably, asked whether a short run costing approach would be preferable to the current long run costing requirements. We don't recommend such a change, nor do we expect the ILECs to advocate such a change.

Despite the fact that the short run planning horizon is more representative of the actual network and cost conditions facing the ILECs, the representatives of those carriers have historically advocated against the use of short run costing approaches for regulatory purposes. Before the FCC and in most state regulatory jurisdictions, ILECs have generally insisted upon focusing on long run costs, to the exclusion of any consideration of short run economic cost data. While some ILECs have occasionally expressed a preference for embedded cost data, they have rarely, if ever, advocated use of short run economic cost data, even as a "second-best" alternative.

Still, if the Commission decides to abandon its TELRIC approach, (e.g. because it relies too much on hypothetical assumptions), it would be preferable to move along the standard continuum of "runs" toward a pure short run costing approach than to adopt an ad hoc cost approach. Furthermore, we believe a short run costing approach would be preferable to an embedded cost approach, (assuming such an approach could be crafted that does not conflict with the prohibition against "a rate-of-return or other rate-based proceeding" contained in section 252(d)(1) of the 1996 Telecom Act).

If it is ultimately determined that the concept of complete variability of investment decisions (not restricted by past investment decisions concerning network configuration and technology) is too hypothetical, it would be preferable for the Commission to shorten the planning horizon (moving along the standard continuum toward the short run), rather than abandoning standard economic cost concepts entirely. It should be recognized, however, that moving very far toward the short run could yield cost results that are substantially lower than those developed under the existing TELRIC rules. This is particularly likely if the FCC were to adopt a short run incremental or marginal costing approach, but it could also be the result of adopting a short run average cost approach.

In closing this section of our report, we would emphasize the crucially important distinction between eliminating unnecessarily hypothetical descriptions or assumptions concerning the actual world, and

extinguishing any and all hypothetical aspects of the cost calculations. By definition, the long run planning horizon reflects, to a substantial degree, a hypothetical situation–one in which costs are highly variable, and a wide range of network configurations and technology choices are available to the firm. This range of options is broader than the array facing an actual firm making decisions in a short run planning horizon.

The ILECs have installed their facilities over many decades, and in the "real world" they incur a mixture of fixed, variable and sunk costs. To the extent the Commission concludes that the TELRIC rules should be modified to place greater emphasis on the "real world" attributes of the existing ILEC networks, the appropriate way to accomplish this would be to explicitly abandon the current long run costing approach and to adopt, on a consistent basis, either a medium run or short run costing approach. However, we do not believe such a dramatic change is necessary, or advisable. Among other reasons, drastic changes of this type would create too much uncertainty for both the ILECs and the CLECs, discouraging investment and slowing the trend toward effective competition.

Other Ways of Defining the Network

FCC Request

We ask parties to suggest other ways of defining the network that is to be modeled in a UNE pricing proceeding. To what extent should network assumptions reflect evidence of the network decisions made by CLECs? Parties should explain in detail the network assumptions they advocate and the competitive assumptions implicit in their proposals. Parties also should explain whether they are proposing a theory based on short run costs or long run costs, and how their proposed definition of the network will produce more accurate economic signals and more consistent results than our current regime.(56)

BJA Analysis

We believe the existing TELRIC rules can appropriately be modified (or clarified) to require greater accuracy in the cost modeling process. Real world attributes can be more accurately reflected in the cost calculations by reducing the use of simplifying assumptions, by gathering more detailed information concerning the "real world" characteristics of the geographic area served by the ILEC, and by using more detailed modeling algorithms.

Our firm has been active in several state proceeding which have explored the potential for increasing the accuracy of long run cost calculations by introducing, or better using, accurate information about "real world" attributes. For example, in work performed on behalf of the Kansas Corporation Commission and the Idaho Public Utilities Commission our firm demonstrated that better information concerning exact customer locations can be useful in improving the accuracy of the modeling process, and that it is practical to reflect existing rights of way (e.g. roads) and other "real world" geographic factors in long run cost calculations.

Our work in these proceeding demonstrates the potential for introducing far higher levels of accuracy and realism into long run cost calculations. In those cases we developed extraordinarily detailed analyses of a small number of wire centers, but the techniques we used are "scalable" and can readily be applied to all wire centers. By gathering detailed information about actual rights of way, exact customer locations (not simulated or estimated) and other important geographic characteristics of each wire center, it is possible to develop more accurate UNE cost results on either a long run or short run basis.

In these proceedings, we simulated in the computer the type of detailed least-cost routing decisions that are made by network engineers when actually designing a distribution system. The least cost path tends to be the one that covers the shortest distance along available rights of way. But a longer routing may be less costly if it allows cable and structure costs to be shared with more customers.

In general, the service distribution layout grows in a branching pattern as customers are added to the system further and further from the serving area interface (SAI). Customers that are far away from the SAI may or may not be connected to the nearest SAI–rather, they will be connected to the network along the specific route that is most efficient and cost effective within the context of a global network optimization problem. Our computerized optimization took into account the actual configuration of all available rights of way (e.g. roads), the proximity of customers to each other, and the impact of physical constraints (e.g. lakes).

In our analyses, the feeder system from the SAIs to the wire center was developed in a cost minimizing manner along actual rights of way using a procedure that closely approximates the detailed calculations performed by network planners. In deciding the best way to connect each SAI the computer considered the shortest potential route along the available rights of way (e.g. actual roads), but exceptions occurred where cost savings could be achieved by using a more circuitous routing along feeder routes that serve another SAI, thereby taking better advantage of potential economies of scale.

The approach we used in these states is more precise (and relies upon "real world" geographic data to a much greater extent) than the typical long run cost studies currently being submitted in most regulatory proceedings. The work our firm performed in these proceedings confirms that it is feasible to greatly reduce the reliance upon "hypothetical" assumptions and to increase the accuracy of cost calculations. For instance, this work confirms that it is feasible to accurately model cost-minimizing cable routes along actual rights-of-way, taking into account the unique features of each wire center, including the location of rivers, bridges, lakes, airports, mountains, and other attributes of each wire center. All of this was accomplished without deviating from basic principles of long run costing, and without excessive reliance on data from the ILEC's existing network.

Higher UNE Prices

FCC Request

Parties that propose changing our network assumptions should explain whether assuming a different network than under the current rules would lead to higher UNE prices. Will that create more situations in which a CLEC will choose to build its own facilities, rather than lease from the ILEC? What is the consequence of such an approach in situations where it is not economically feasible for a CLEC to build its own facilities? We ask parties that favor a change in network assumptions to identify how such a change would affect each component of the pricing rules (*e.g.*, operating expenses, cost of capital, depreciation).(59)

BJA Analysis

Moving along the standard continuum of planning horizons toward a short run cost approach could lead to either higher or lower UNE rates, depending upon the factual circumstances present in each state. The impact of such a change could vary widely, depending upon the extent to which the ILEC is relying on obsolete technology, the extent to which it has large amounts of excess capacity in its network, and other circumstances. Assuming the move toward short run costs is properly implemented, there is no reason to assume it will consistently increase UNE rates.

In fact, if the Commission were to adopt a short run incremental or marginal cost approach–one that excludes sunk costs associated with obsolete technology, it is likely that the resulting UNE rates would generally be lower than those developed using the existing TELRIC rules. While the impact can vary depending on circumstances, we would anticipate that a short run incremental or marginal cost approach will generally yield rates that are lower than TELRIC in the typical case–one in which substantial excess capacity exists within the network, and relatively little additional capital investment is needed to accommodate the CLECs' use of the ILEC's network.

The Act's unbundling requirement was developed for the express purpose of reducing barriers to entry and encouraging efficient competitive entry into local exchange markets. This purpose will be frustrated if the prices established for UNEs are increased to excessively high levels, as could easily occur if the Commission abandons standard economic theory and adopts an ad hoc costing approach that relies heavily on ILEC network data.

In order to establish network element prices that are neither too high nor too low, the FCC should continue to use forward looking economic costs, estimated in a manner that is fully consistent with standard principles of economics. This can be achieved by continuing to focus on long run costs, but it can also be achieved by using short run economic costs, provided the latter approach is implemented in a manner which is consistent with standard principles of economics.

The Commission should be cautious about adopting rule changes which rely on ILEC network data, because these changes could easily have the effect of consistently increasing UNE rates (e.g. because the ILECs will have an informational advantage in state proceedings).

If changes to the existing TELRIC rules translate into consistently higher UNE rates, the primary impact will <u>not</u> be to encourage CLECs to invest in more of their own facilities. To the contrary, the primary impact of higher UNE rates will be to increase barriers to entry and to slow the trend toward effective competition. This follows directly from the fact that UNEs are only available where impairment exists, and thus most CLECs cannot avoid using UNEs if the rates are increased.

Accordingly, the predictable result of increasing UNE rates will not be to stimulate more investment by CLECs. To the contrary, the predictable result will be to further shield the ILECs' retail operations from downward pricing pressures, and to further postpone or permanently reduce the benefits of effective competition (e.g. by making it impossible for competitors to profitably serve certain markets).

Technology

FCC Request

We seek comment on our tentative conclusion that, "...it is unlikely that any carrier, no matter how competitive the marketplace, would deploy new technology instantaneously and ubiquitously throughout its network." (68)

BJA Analysis

Firms typically deploy technology over a period of years. Thus, a typical network contains a variety of different technologies from different time periods–some nearing the end of its usable life cycle, some relatively new, some just installed. But this is a consequence of a sequence of short run planning decisions, rather than something that would appropriately be considered in the context of a long run planning horizon. To the extent the Commission wants to analyze costs of a network that includes different vintage technologies, this should be implemented in a short run (rather than long run) costing approach.

In the long run, a carrier can precisely adapt the scale and configuration of its operations to match market conditions and to take advantage of the best available technology. Costs that would typically be fixed in the short run are analyzed under the assumption that they are variable. This provides the firm with the opportunity to select the configuration and mixture of technologies that best minimizes its costs.

It is certainly true that in normal practice firms do not deploy new technology instantaneously and ubiquitously throughout their operations. Nevertheless, that assumption (whether implicit or explicit) is a fundamental feature of the long run planning horizon. It follows directly from the fact that within a long run planning horizon a firm can install the exact quantity and quality of equipment that optimally fits the number of customers it serves and the types of services it sells.

In the real world, at any given time, many of the carrier's costs will be fixed and some will be sunk. In turn, this implies that some of its technology was installed in prior periods and isn't necessarily the current best choice, and some of its technology may be obsolete. The presence of fixed or sunk costs influences a firm's optimization criteria, thereby causing the carrier to make decisions which are different from what would be optimal in the long run. The long run planning horizon allows a carrier enhanced freedom to select the most cost-effective choice. For this reason, it is assumed the firm has greater flexibility to minimize its total costs (and thus its average costs) in the long run than it has in the short run. This flexibility includes additional options, like fine-tuning of cable sizes and types, and the freedom to avoid the use of older, less cost effective technologies, which aren't necessarily available in a short run planning horizon. In fact, the presence of existing facilities of a given size, configuration and technology lies at the very core of the distinction between the long run and the short run, largely explaining observed differences between short and long run costs. Thus, if the Commission concludes that the assumption that all costs are variable (and thus new technology can be deployed instantaneously and ubiquitously throughout the network) is too unrealistic or is otherwise objectionable, it should move to a medium run, or short run, costing approach. The Commission should not abandon the standard continuum of planning horizons, nor should it move to an ad hoc costing approach, with all the uncertainties that would entail.

Responses to FCC Requests for Comment: Cost Model Assumptions and Inputs

Routing Assumptions

FCC Request

We seek comment on the network routing assumptions that would be consistent with our tentative conclusion that prices should account for the real world attributes of the routing and topography of an

ILEC's network. Specifically, how critical are the locations of existing rights-of-way, existing poles, and existing conduit (all of which are located on existing roads and routed around existing natural obstacles) for all wireline carriers (incumbents and new entrants) when new facilities are built? Is there any theoretical basis for an approach that does not assume the existence of existing roads, buildings, and natural obstacles? (63)

BJA Analysis

As discussed earlier, it is feasible and appropriate to consider available rights of way, rivers, mountains and other physical constraints. Where simplified approaches are used, they can lead to modeling error. For instance, the Commission adopted a simplified approach in the Synthesis Model it uses for universal service funding purposes. To the extent a cost model connects customers to the wire center using air distances, or rectilinear assumptions derived from air distances, modeling error can occur, because rights of way and other physical constraints are ignored.

In most cases, an attempt is made to minimize the potential for modeling error through the careful selection of inputs and assumptions. This was the approach used in selecting inputs to the synthesis model, based upon rectilinear assumptions:

> We tentatively conclude that the synthesis model should use rectilinear distance, rather than airline distance, in calculating outside plant distances,[1] because this more accurately reflects the routing of telephone plant along roads and other rights of way. In fact, research suggests that, on average, rectilinear distance closely approximates road distances.[2] As a result, we tentatively conclude that the road factor in the model, which reflects the ratio between route distance and road distance, should be set equal to 1. [Id., ¶ 62]

However, these simplifying assumptions aren't necessarily accurate under all circumstances. For example, in a mountainous area, roads may curve back and forth up the mountain, requiring much more cable than the rectilinear routing assumed by the Commission in its synthesis model. Similarly, where cable must be routed around lakes,

military bases, airports, and other obstacles, more cable might be required to follow actual rights of way than the amount generated by the simplified rectilinear assumptions used in the model. Conversely, in some areas the actual rights of way might follow more direct routes than the simplified rectilinear assumptions used in the model.

If the Commission is going to require greater accuracy with regard to rights of way, it should also insist upon greater accuracy with respect to actual customer locations. It is not appropriate to assume that customers are spaced uniformly along roads, even when they are not. Particularly in rural areas, there may be long stretches of roads without any customers. All of the customers in a given area may be clustered in a relatively small number of locations near each other. If customers are clustered along certain portions of the roads, or if they are concentrated along certain roads and not others, an assumption of uniform spacing can be highly misleading.

The detailed analyses we performed in Idaho and Kansas (discussed earlier) confirm the potential importance of this issue. Where customers are assumed to be uniformly spread along every road, a cost model will tend to place cable along every part of a given geographic area, whereas in reality, network engineers don't need to send cable to anywhere except to the specific areas where customers are actually located. In urban areas this discrepancy between reality and assumptions may not be tremendously significant, since customers may be located on nearly every street, and the variation in spacing between customers isn't as significant. However, in rural areas the gap between algorithm and reality may be severe in some places. In some rural areas, there are long stretches of empty roads, yet the cost modeling process may fail to recognize this fact; instead, the model may simply assume customers are spread throughout the entire area, and thus the model places cable in locations where it isn't needed.

In rural areas–where the nuances of customer locations and geographic accuracy are most important and have the greatest potential impact on the cost calculations–accurate geocoded customer location data may be difficult to obtain, but it certainly isn't

impossible or impractical to do so. To the contrary, every phone that is connected to the wired network has a specific location, and that location can be identified and mapped. The geocoding "failure" rate can be reduced by using additional data sources, such as the data base used in providing E911 service. To the extent the existing computerized data sources are inadequate, more accurate data can be gathered in the field using GPS technology, as we demonstrated in our work on behalf of the Idaho Public Utilities Commission.

Scorched Node

FCC Request

Regardless of whether we adopt our tentative conclusion, should we modify the "scorched node" theory and adopt routing assumptions more closely tied to an ILEC's existing network? (64)

BJA Analysis

The scorched node approach in its current form is appropriate and should be retained, unless the Commission decides to adopt a medium run or short run costing approach. In a long run planning horizon all costs are variable, and thus the ILEC's existing network configuration isn't particularly relevant. The existing network configuration is only relevant to the extent it provides an indication of the configuration that would be optimal in a long run planning horizon–in other words, to the extent it is the same configuration that would be chosen by a cost minimizing carrier operating in the long run.

Cost Models Adopted

FCC Request

Under our current TELRIC rules, the rates established in a state pricing proceeding depend significantly on the computer cost model adopted by the state commission. We ask parties to comment on whether, and how, our tentative conclusion to account more closely

for the real world routing and topography of an incumbent's network would affect the ability of carriers to use computer cost models. (66)

BJA Analysis

Our work in Idaho and Kansas demonstrates that real world routing and topography can be incorporated into long run costs studies using computerized cost models. For the reasons stated above, we do not believe it is appropriate to reflect the incumbents existing network topology in a long run cost study, at least to the extent that topology is inconsistent with the configuration which would be optimal in a long run planning horizon.

Nevertheless, if the Commission decides to adopt a medium run or short run approach, relying to a greater degree on the incumbent's specific network configuration, that can also be accommodated within a computerized cost modeling approach, provided the ILEC is required to provide the necessary network routing data to other parties for use in their cost models.

Sharing Percentages

FCC Request

We ask parties to offer suggestions on how the Commission might provide guidance to state commissions on the method for establishing structure sharing percentages, particularly in light of our tentative conclusion that the pricing methodology should account for real world attributes of the routing and topography of an ILEC's network. Is it appropriate to consider sharing opportunities that were available at the time the plant was built, as the Commission suggested in the *USF Inputs Order*? (72)

BJA Analysis

With respect to this issue, as with others, the answer depends somewhat on whether the Commission decides to abandon its requirement that UNE rates be based upon long run costs. For

instance, if the Commission adopts a short run costing approach, it would be appropriate to assume a lesser degree of sharing, consistent with the more limited options that typically exist in a short run context.

Even within the context of a long run study it is appropriate to recognize difficulties involved in attempting to share the cost of buried cable trenching and placement with other entities. Because of voltage differences and safety concerns, sharing of buried costs with the electric utility is relatively difficult and rare. The primary opportunity for sharing of buried structure costs occurs in new subdivisions, where cable TV and telephone cable can sometimes be placed simultaneously. Even in the context of a "fresh build" scenario, this type of cost sharing would not necessarily be possible along every route, because it still assumes a degree of scheduling co-ordination with another entity which may not be feasible (e.g. if the cable TV carrier has already installed its cable). These problems stand in sharp contrast with aerial structures, where multiple entities can install different types of cable, and these cables can all be installed at different times.

Finally, we would note that inter-carrier sharing isn't the only type of cost sharing that needs to be considered. It is also feasible to share structure and placement costs between interoffice, feeder and distribution cable. Feeder and distribution cable can be (and frequently are) attached to the same pole, and both types of cable can be placed in the same trench. In designing a forward-looking network, it is inevitable that feeder and distribution cable will need to be placed in parallel along many route segments. The importance of this becomes even more when one starts focusing on actual rights of way. Interoffice and feeder cable both tend to be placed within utility easements and along roads. There will often be customers located along these same easements and roads that need to be served with distribution cable. Since all three types of cable tend to be placed within the same easements along the same roads, there is no logical reason to ignore the many opportunities for all three types of cable to be placed on the same poles and placed in the same trenches.

Fill Factors

FCC Request

We seek comment on appropriate guidelines for states to follow in establishing fill factors. (74)

BJA Analysis

Fill factors (essentially the same concept is sometimes described in terms of utilization rates) are estimates of the fraction of total plant which is actually being used. The amount of spare capacity reflected in the fill factors used in a long run cost study will directly impact the resulting unit costs (e.g., cost per circuit or cost per minute of use). Excessively low fill factors raise the per unit costs and vice versa.

The key distinction between long run and short run costs is the extent to which the carrier is able to vary its plant mix and capacity to match demand for its output. In a long run planning horizon, the carrier can optimize its capacity to closely match its output. Accordingly, in a long run cost study, the amount of capacity should closely match the level of output reflected in the study. There should be enough spare capacity to provide operational flexibility (e.g., the ability to quickly respond to fluctuations in the day-to-day level of demand), but not much more. In comparison, a somewhat larger amount of spare capacity would normally be present on an actual network, where conditions are more like the economists' definition of the short or medium run.

Because of the presence of substantial fixed costs (and associated plant and equipment configuration and scale factors that are also fixed), it would not be surprising to see a larger amount of spare capacity in a short run cost study than in a long run study. In a short run study taking into account a firm's actual network configuration, at some locations the carrier may have less spare capacity than would be ideal, thereby increasing its total costs of administration and maintenance, or forcing it to rely upon more costly routes in order to provide circuits between particular locations. At other locations the

carrier might have more capacity than would be optimal in the long run. For instance, the firm might have anticipated future growth that hasn't materialized, or it might have mis-estimated future demand levels.

The key point to understand is that sub-optimal fill factors are often observed in the "real world" and they will be appropriately reflected in a properly constructed short run cost study. However, sub-optimal fill levels should not be included in a long run cost study. To the contrary, to be consistent with the underlying principles that govern this type of study, and to be consistent with other aspects of this type of study**,** the fill factors in a long run cost study should always be very close to the *optimal, cost minimizing level* (taking into account the unavoidable impact of lumpiness of investments). Any substantial deviation from this cost minimizing optimal level of spare capacity is inappropriate, and represents a serious departure from the basic principles which should govern a long run study.

In a long run planning horizon, a carrier is assumed to maintain an appropriate amount of capacity which is just sufficient to meet demand for its services, plus a reasonable amount of spare capacity to allow for administrative convenience, operational flexibility, safety backup, and the like. Stated differently, in a long run cost study all costs, and thus all plant configuration details, are variable. Therefore, it isn't appropriate to incorporate unnecessary or inefficient levels of spare capacity in a long run cost study. To the contrary, a long run study should be strictly focused on capacity levels which are optimally matched to the volume of circuits and traffic reflected in the study.

In a long run scenario, efficiencies are close to their peak and spare capacity costs are minimized. In its *Local Competition Order*, the Commission made an exception to the absolute "least-cost" solution when it rejected a purely hypothetical network by selecting a "scorched node" approach. However, the Commission has generally endorsed the traditional interpretation of long run costs. Clearly, under the current TELRIC rules UNE rates are supposed to be based

upon the cost of an efficient network–not one with high levels of spare capacity:

> Prices based on the least-cost, most efficient network design and technology replicate conditions in a highly competitive marketplace by not basing prices on existing network design and investments unless they represent the least-cost systems available for purchase. [¶683]
>
> ... We, therefore, conclude that the forward-looking pricing methodology for interconnection and unbundled network elements should be based on costs that assume that wire centers will be placed at the incumbent LEC's current wire center locations, *but that the reconstructed local network will employ the most efficient technology for reasonably foreseeable capacity requirements.* [¶685, emphasis added.]

To be consistent with the classic definition of long run cost, a forward-looking study should use fill factors that are higher than the average fill level typically present in an ILEC's network, but less than the highest fill levels that are sometimes present in such a network. Aside from the problems associated with lumpiness, the fill factors should approach the "target" levels used by network engineers to determine when more facilities must be installed, or network rearrangements are required.

If the Commission wants to establish clearer guidelines for fill factors, it could require use of a *life cycle* analysis. A life cycle analysis can examine, for instance, the percentage of spare capacity (or fill factor) that would be present at the time a cable is installed, and at various years thereafter. The only plausible economic rationale for including large amounts of spare cable would be in anticipation of potential growth in demand over the life cycle of the plant in question. Thus, for example, if one assumes a cable will be used for 20 years, one might argue that large enough cables must be installed to ensure that the capacity of these cables won't be exceeded at any time within the entire 20 year life cycle.

Even if one accepts this line of reasoning, however, it wouldn't be appropriate to develop a long run cost study based upon the amount of spare capacity that will be present at the very beginning of the

entire 20 year life cycle. This would be highly misleading, since the cost study containing such a factor would be based upon the "worst case" scenario at the beginning of the life cycle. In practice, the amount of spare capacity will steadily decrease over time, and the cost of that diminishing level of spare capacity will be spread over a larger and larger number of units as growth occurs. Thus, the effective cost of spare capacity on a per unit basis (e.g., per working circuit) will be lower than the amount estimated using this inappropriate fill factor during at least 19 of the 20 years in the cable plant life cycle.

If one is going to consider future growth as a rationale for providing extra spare capacity, then the appropriate calculations would need to look at the average level of spare capacity over the relevant period, not simply the amount of spare capacity at the very beginning of the growth cycle. The costs of the extra capacity installed to meet future growth should be offset by the additional revenues that will be received due to future growth in demand. In order to get a proper matching of costs and benefits, it wouldn't be appropriate to spread the entire cost of spare capacity needed for future years over the current volume of units.

Properly handled, the cost of extra capacity installed to serve future demand would not place a substantial burden on current ratepayers, because the calculations would recognize that this extra capacity will be paid for by future ratepayers. Regardless of whether a life cycle analysis is used, or a simplified approach is used, the fill factor should be reasonably representative of the minimum level of spare capacity that can be realistically be achieved by a carrier that is minimizing cost within a long run planning horizon.

Switching

FCC Request

We seek comment on whether unbundled switching costs should be based on the prices that an efficient ILEC or other entrant would pay

for switching equipment over the life of the switch and not at a particular point in the switch's life cycle. (78)

BJA Analysis

In a long run cost study, the initial cost of acquiring a new switch is highly relevant and should be given great weight. Among other reasons, new switch transactions represent a substantial fraction of the total volume of sales by switch manufacturers. Purchasers of new switch equipment are often given additional discounts as rewards for high volume purchases or as an enticement for committing to a particular technology. Were a long run cost study to ignore these new switch discounts, the effect would be to seriously overestimate the actual cost of switching equipment.

Over the life cycle of a typical switch, carriers will make routine modifications and additions. An addition may be made to enable the switch to serve more lines. As with the cost of a new switch, it is not appropriate to completely ignore the cost of routine modifications and additions which occur throughout the life cycle of the switch. Accordingly, we agree with the FCC's suggestion that prices for switching equipment should consider the prices that an efficient ILEC or other entrant would pay for switching equipment over the life cycle of the switch.

The approach used by the Commission in its universal service cost model is flawed in this regard. The Commission's synthesis model uses default inputs for switching equipment that is limited to new switch purchases. It would be more appropriate to consider costs associated with both new and growth purchases–both of which may be accompanied by discounts to the purchaser. If such discounts are written into the purchasing contract, the blend of discounts received over the life cycle of the switch ought to be considered, with the greatest weight being given to the initial purchase cost. Needless to say, to be consistent with the basic tenets of a long run planning horizon, the study should include the cost of a new switch which is optimally matched to the actual volume of output. However, in order to reflect the actual cost of switching over the entire life cycle of the

switch, consideration should appropriately be given to higher prices (lower discounts) where they apply to expansion and modifications which occur after the switch is initially installed.

Considering any lower discounts (higher prices) on purchases of extra line cards and equipment needed for "growth" maintains consistency with the assumption of relatively high utilization rates or fill factors which are appropriate in a long run cost study.

There are three basic ways modifications and growth can be accommodated by a carrier: by acquiring an inventory of spare parts at the time the switch is purchased; by installing a switch that is large enough to accommodate all future growth; by purchasing adding capacity-expanding equipment as needed throughout the life cycle of the switch.

To minimize costs, a carrier may decide not maintain a large inventory of spare parts, or to over-size its switches, but to instead depend on the manufacturer to provide additional components as needed, in order to accommodate growth and fluctuations in demand. The manufacturer typically has higher transaction costs, and achieves a higher profit margin on these smaller subsequent sales. Hence, higher prices may be charged after the initial purchase. To the extent different prices apply, in evaluating the life cycle cost of switching equipment in a long run study, it is appropriate to give some consideration to the prices associated with these smaller subsequent transactions. Succinctly stated, the actual discounts obtained over the entire life cycle of the switch should be considered in long run cost studies.

Cost of Capital

FCC Request

We ask parties to identify the specific variables that determine the cost of capital under the network assumptions that they advocate, and to offer suggestions as to how to quantify the various components of risk that should be reflected in a company's cost of

capital. What are the theoretical arguments that support the use of these variables. (85)

BJA Analysis

If the Commission continues to require a long run costing approach when setting rates for UNEs (as we recommend), capital costs should be based upon a cost-minimizing and efficient capital structure. In practice, this means one in which the carrier relies upon low cost debt to the largest extent feasible (given concerns about reasonable overall risk levels), and relatively little reliance upon high cost common equity.

In its August 8, 1996, *Implementation Order*, the FCC stated as follows:

> 706. Based on the current record, we conclude that the currently authorized rate of return at the federal or state level is a reasonable starting point for TELRIC calculations, and incumbent LECs bear the burden of demonstrating with specificity that the business risks that they face in providing unbundled network elements and interconnection services would justify a different risk-adjusted cost of capital or depreciation rate. These elements generally are bottleneck, monopoly services that do not now face significant competition.... States may adjust the cost of capital if a party demonstrates to a state commission that either a higher or lower level of cost of capital is warranted, without that commission conducting a "rate-of-return or other rate based proceeding."

We agree with this approach, and see no need to change it. Although there are numerous considerations involved in the determining the cost minimizing capital structure, it is clear that within limits, lower total costs can be achieved by increasing the use of the debt component and reducing reliance upon equity capital. Since the cost of equity is generally higher than the cost of debt, and since interest is deductible for federal income tax purposes while equity returns are taxable, it makes economic sense to maintain a relatively high debt level and a relatively low equity level, particularly where a firm is well established and it faces relatively mild business risks. Of course, debt leveraging should not be so extreme that

interest coverage deteriorates below an acceptable level and lenders become unwilling to provide debt capital to the firm.

For purposes of this proceeding it is important for the Commission to use a reasonable estimate of the cost of capital, consistent with sound cost-minimization assumptions. Long run economic cost estimates should be based on the most efficient and cost-effective way of doing business. Any higher cost estimate would force CLECs to pay excessive rates for UNEs, defeating the purpose of regulating the rates charged for use of these elements.

Consistent with standard long run cost assumptions, UNE costs should be based upon an economical and efficient capital structure. Since ILECs can raise debt capital at a cost that is substantially below their cost of equity, with the resulting interest expense deducted from state and federal income taxes, it is not appropriate to assume a high equity ratio–one that translates into unnecessarily high costs.

Finally, we would note that it is not appropriate to develop capital cost calculations using stock market valuation data to weight the mixture of debt and equity. This approach is flawed because it fails to consider cost minimization. It is particularly inappropriate in the current situation, where the ILECs are earning supracompetitive profits. When a firm is earning more than its cost of capital, its stock price tends to increase. In turn, this shifts the market capitalization data to place greater weight on equity and less weight on debt. Where excess profits are being earned, the debt-equity calculations can be greatly distorted because the current market value of a carrier's stock may increase far above the amounts actually invested (and above the cost minimizing amount necessary to finance the carrier's investment).

Depreciation

FCC Request

We also ask parties to comment on whether FCC regulatory lives reflect the competition and technology assumptions required under a forward-looking costing methodology. (101)

BJA Analysis

In general, we believe the FCC-prescribed depreciation lives are sufficiently forward-looking, reflecting the effects of rapid technological change and competition. In setting the generic ranges prescribed in Docket No. 92-296, the Commission made several statements that confirm it was following a forward-looking approach:

> [W]e based the ranges on statistical studies of the most recently prescribed factors. These statistical studies required detailed carrier-by-carrier analyses of the most recent plant retirement patterns, the carriers' plans, and the current technological developments and trends. Because the proposed ranges reflect these data, we believe that the ranges provide a reasonable degree of confidence that the basic factors falling within their bounds will produce depreciation rates accurately reflecting plant retirements, company plans, and technological trends. [*Second Report and Order*, Docket No. 92-296, ¶ 25].

It is clear that the Commission has attempted to take into account both technological change and economic obsolescence in establishing the generic ranges, as well as the depreciation rates set for individual companies. Furthermore, it is readily apparent that most, if not all, of the prescribed lives are considerably shorter than the expected physical life of the property in question. In other words, the Commission recognizes that property may be retired for economic reasons prior to the time that wear and tear or physical deterioration would preclude its continued use.

While parties may disagree with the precise lives which have been approved by the FCC (as we do, in some cases) there is no indication that the approach used by the Commission in establishing regulatory depreciation rates is inconsistent with the approach which is appropriate in calculating long run costs. To the contrary, regulated deprecation rates reflect the impact of all relevant economic factors, including competition and technological change, as well as physical factors. The Commission does not wait for competition, technological change, or economic obsolescence to occur before taking it into account. Instead, trends are considered, and future patterns of economic obsolescence are anticipated. The Commission tries to accurately anticipate the future pattern of retirements for each category of investment, based upon economic and engineering judgments relating to future technological change, changing customer preferences, and similar economic factors. Accordingly, it is reasonable and appropriate to use regulatory depreciation rates when setting UNE rates.